Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (previously presented) The method of claim 6, wherein the hydrothermally stable modified alumina support comprises a transition alumina and at least one modifying agent comprising said element from the Periodic Table with an atomic volume between about 6 and about 14 cm^3/mol, and further wherein the depositing step (B) comprises depositing a precursor of the at least one modifying agent onto the transition alumina.

2. (previously presented) The method of claim 1, wherein the atomic volume of the element is between about 9 and about 11 cm^3/mol.

3. (previously presented) The method of claim 1, wherein the transition alumina comprises gamma-alumina.

4. (previously presented) The method of claim 1, wherein the element is aluminum.

5. (previously presented) The method of claim 4, wherein the at least one modifying agent comprises the form of a hydroxide, an ion, or mixtures thereof.

6. (currently amended) A method for producing hydrocarbons, comprising:

providing a reactor having a catalyst comprising a hydrothermally stable modified alumina support;

contacting a reactant gas comprising carbon monoxide and hydrogen with the catalyst to produce the hydrocarbons; and

wherein the hydrothermally stable modified alumina support is made by a process comprising:

(A) providing an alumina precursor;

(B) depositing a modifying agent comprising an element from the Periodic Table with an atomic volume between about 6 and about 14 cm^3/mol onto the alumina precursor; and

(C) calcining the deposited alumina precursor between 500°C and 900°C to form the hydrothermally stable modified alumina support.

7. (original) The method of claim 6, wherein the alumina precursor of step (A) comprises one or more transition alumina phases.

8. (original) The method of claim 7, wherein the alumina precursor of step (A) comprises one or more transition phases selected from gamma, delta, kappa, eta, chi, rho, and theta.

9. (original) The method of claim 6, wherein step (A) further comprises pre-treating the alumina precursor.

10. (original) The method of claim 9, wherein pre-treating comprises spray drying, dehydrating, drying, steaming, or calcining.

11. (original) The method of claim 6, wherein step (A) further comprises dispersing the alumina precursor in a solvent to form a sol.

12. (original) The method of claim 11, wherein depositing the modifying agent onto the alumina precursor of step (B) further comprises depositing the modifying agent onto the sol.

13. (original) The method of claim 12, wherein the sol is spray dried after depositing the modifying agent onto the sol.

14. (currently amended) The method of claim 6, wherein step (B) is accomplished by spray-drying, impregnation, co-precipitation, ~~or~~ chemical vapor deposition, or plasma sputtering.

15. (original) The method of claim 14, wherein impregnation comprises incipient wetness impregnation.

16. (original) The method of claim 6, wherein the modifying agent of step (B) comprises aluminum.

17. (original) The method of claim 6, wherein the modifying agent of step (B) comprises an aluminum salt, dispersible boehmite, dispersible pseudo-boehmite, or mixtures thereof.

18. (currently amended) The method of claim 17, wherein step (C) is accomplished at temperatures from ~~about 250~~ 500 °C to about ~~900~~ 800 °C.

19. (original) The method of claim 6, wherein step (B) further comprises depositing at least one additional modifying agent onto the alumina precursor.

20. (currently amended) The method of claim 6, wherein step (C) is accomplished at temperatures between 500 and ~~900~~ about 800 °C.

21. (currently amended) The method of claim ~~20~~ 6, wherein the atomic volume of the element is between about 8 and about 12 cm^3/mol.

22. (currently amended) The method of claim ~~21~~ 6, wherein the atomic volume of the element is between about 9 and about 11 cm^3/mol.

23. (original) The method of claim 6, wherein the hydrothermally stable alumina support comprises an oxide of the element, and wherein the element oxide has a molecular volume lower than that of aluminum oxide.

24. (original) The method of claim 23, wherein the element oxide has a molecular volume between about 10 and about 25.7 cm^3/mol.

25. (original) The method of claim 6, wherein the alumina precursor comprises gamma-alumina.

26. (original) The method of claim 6, wherein step (B) is accomplished by impregnation.

27. (currently amended) The method of claim 6, wherein step (C) is accomplished at temperatures between about 800°C and ~~about~~ 900°C.

28. (canceled)

29. (previously presented) The method of claim 35, wherein the aluminum-modified alumina support is made by a method comprising impregnating the modifying agent precursor to the alumina precursor.

30. (previously presented) The method of claim 29, wherein the aluminum hydroxide comprises boehmite, pseudo-boehmite, gibbsite, or mixtures thereof.

31. (previously presented) The method of claim 29, wherein the aluminum salt comprises aluminum nitrate, aluminum lactate, aluminum acetate, or combinations thereof.

32. (previously presented) The method of claim 35, wherein the alumina precursor comprises a transition alumina.

33. (previously presented) The method of claim 35, wherein the alumina precursor comprises gamma-alumina.

34. (previously presented) The method of claim 42, wherein the catalytically active metal comprises cobalt.

35. (currently amended) A method for producing hydrocarbons, comprising:

(A) providing a reactor having a catalyst comprising an aluminum-modified alumina support; and

(B) contacting a reactant gas comprising carbon monoxide and hydrogen with the catalyst to produce the hydrocarbons,

wherein the aluminum-modified alumina support is modified by at least one modifying agent comprising aluminum by ~~applying~~ depositing a modifying agent precursor comprising an aluminum salt, an aluminum hydroxide, or mixtures thereof, to an alumina precursor, and calcining the deposited alumina precursor between 500°C and 900°C.

36. (original) The method of claim 35, wherein the hydrocarbons comprise primarily at least 9 carbons.

37. (canceled)

38. (previously presented) The method of claim 35, wherein the modifying agent precursor comprises dispersible boehmite, dispersible pseudo-boehmite, or mixtures thereof.

39. (previously presented) The method of claim 35, wherein the alumina support is further modified by at least one additional modifying agent.

40. (original) The method of claim 35, wherein the catalyst comprises at least one promoter selected from the group consisting of platinum, palladium, ruthenium, rhenium, silver, boron, copper, lithium, sodium, potassium, magnesium, and combinations thereof.

41. (previously presented) The method of claim 35, wherein the catalyst of step (A) comprise a catalytically active metal comprising at least one metal selected from the group consisting of Group 8 metals, Group 9 metals, Group 10 metals, molybdenum, rhenium, and tungsten.

42. (previously presented) The method of claim 35, wherein the catalyst of step (A) comprises a catalytically active metal comprising at least one metal selected from the group consisting of cobalt, ruthenium, iron, nickel, and combinations thereof.

43. (previously presented) The method of claim 35, wherein the reactant gas of step (B) contains hydrogen and carbon monoxide in a molar ratio of from about 0.67:1 to about 2.5:1.

44. (previously presented) The method of claim 35, wherein the aluminum salt is selected from the group consisting of aluminum carbonate, aluminum acetate, aluminum acetyl acetonate, aluminum lactate, aluminum nitrate, aluminum chloride, aluminum oxalate, and mixtures thereof.

45. (new) The method of claim 35, wherein the calcining step is accomplished at temperatures between 500 and about 800 °C.

46. (new) The method of claim 35, wherein the calcining step is accomplished at temperatures between 750 and 900 °C.